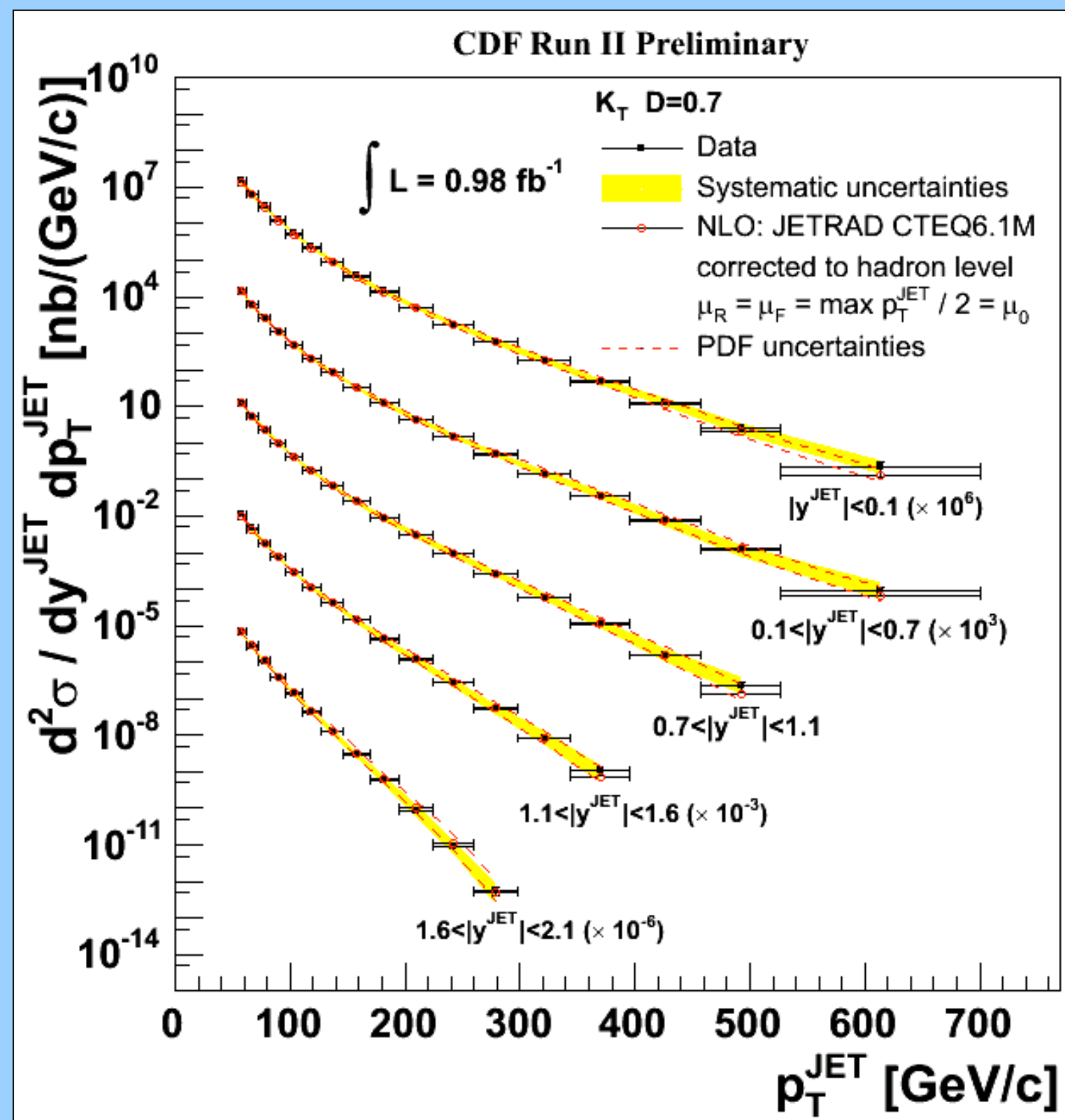


Recent QCD Results from CDF

Inclusive and b Jet Cross Sections

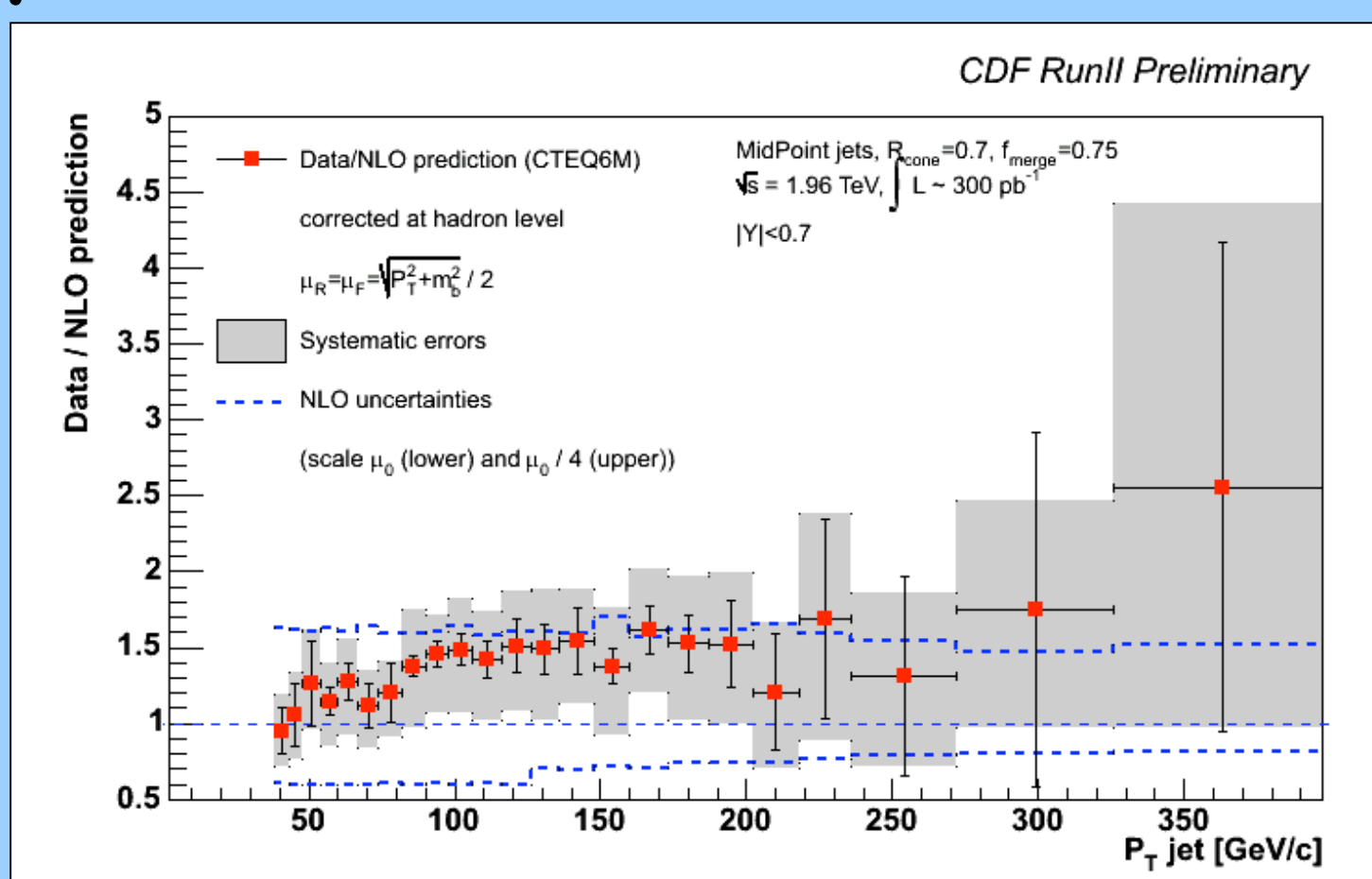
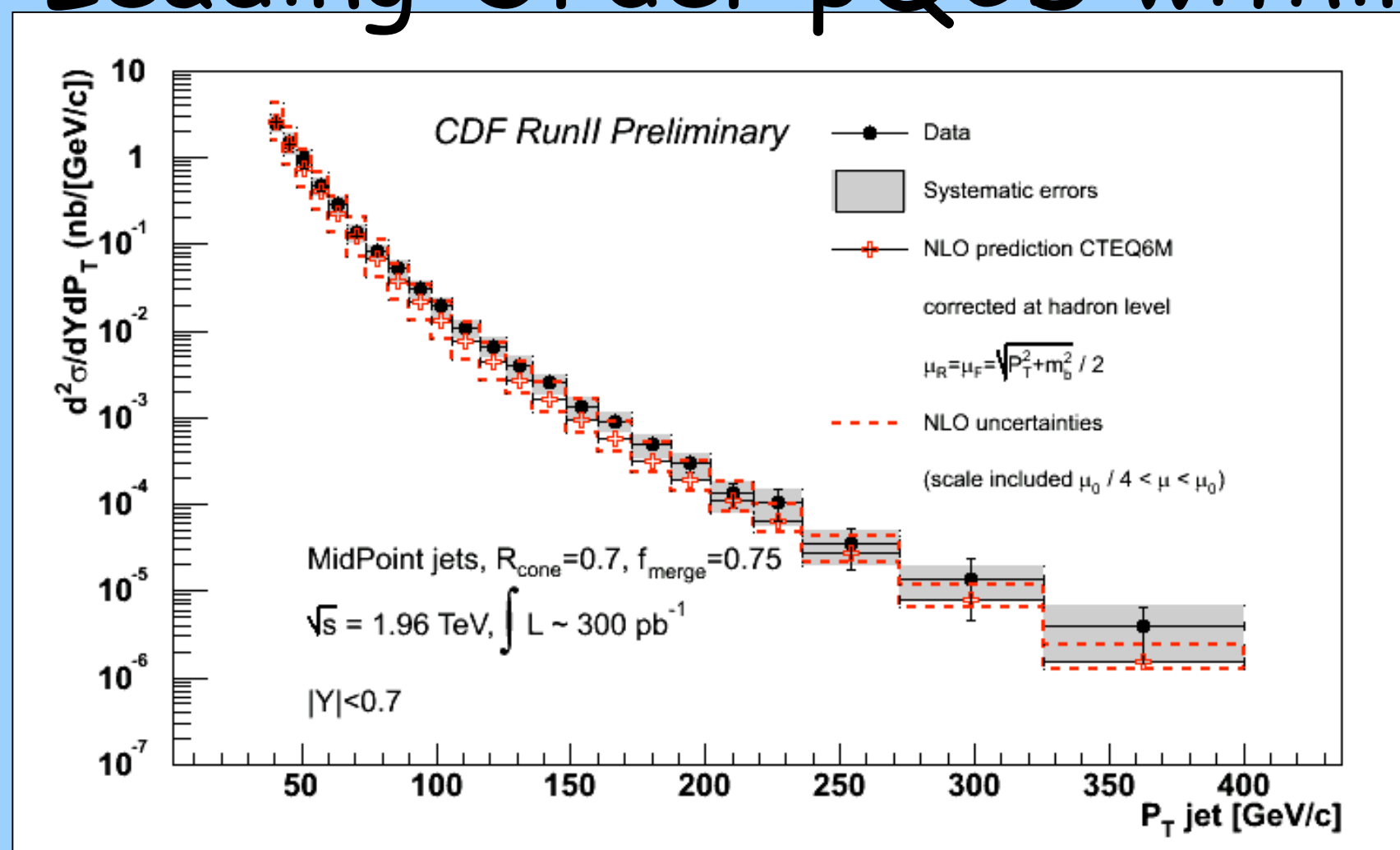
Inclusive Jet Cross Section



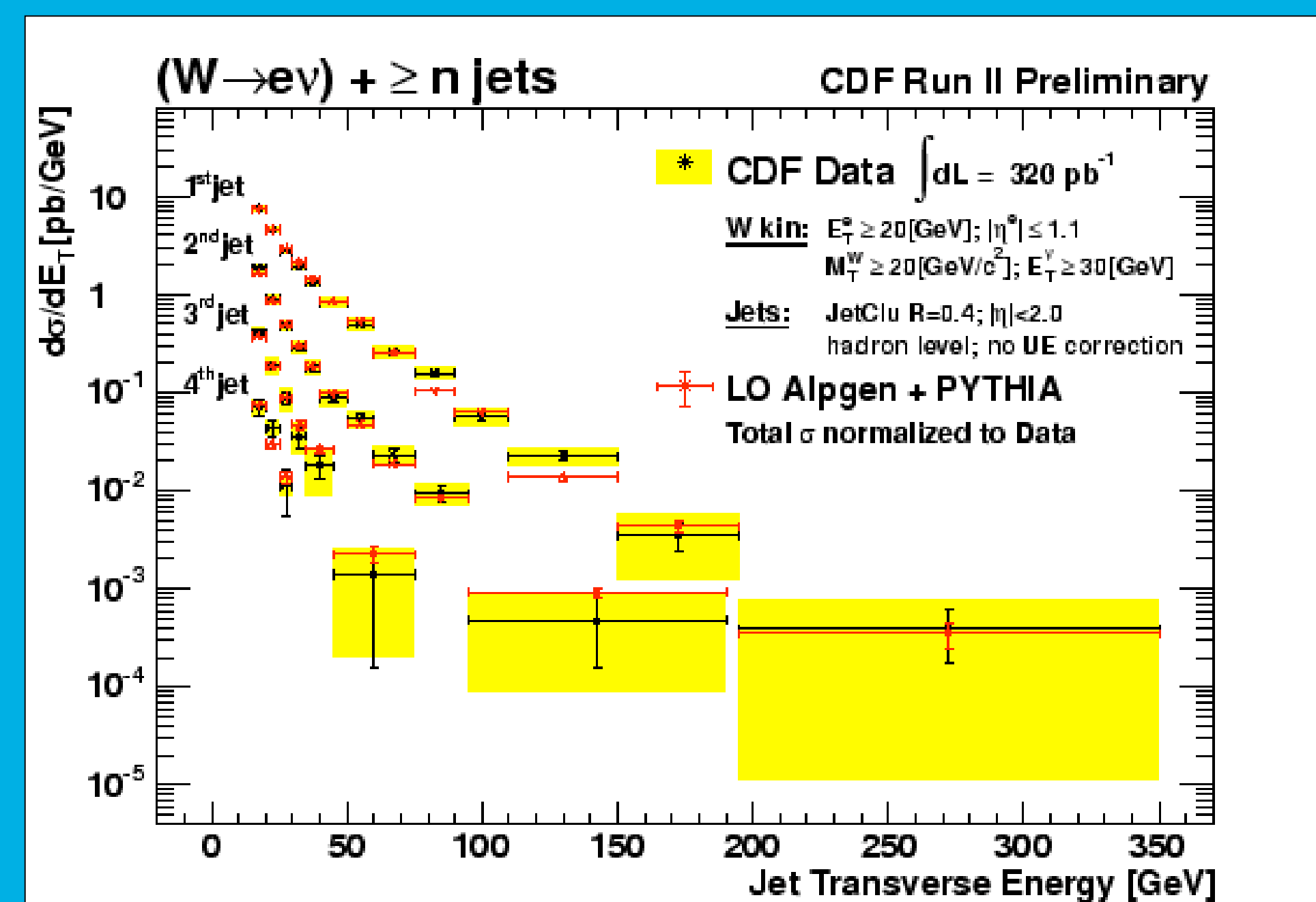
- ✓ New inclusive jet measurements include 1fb⁻¹ of data and extend to forward rapidity regions
- ✓ Good agreement between data and perturbative QCD

New results in the forward region will reduce PDF uncertainties!

Measured b -jet cross section agrees with Next-to-Leading-Order pQCD within systematic uncertainties



W/Z + Jets Cross Section



Cross Sections for Production of a W boson with 1, 2, 3, and 4 Jets

- ✓ W/Z + jets is a possible signature for production of:
 - ✓ Top pair and single top
 - ✓ Higgs boson
 - ✓ Supersymmetric particles
 - ✓ QCD production of W/Z + jets is a large background for these processes

Presence of W/Z ensures the kinematics of the event provide a good testing ground for pQCD

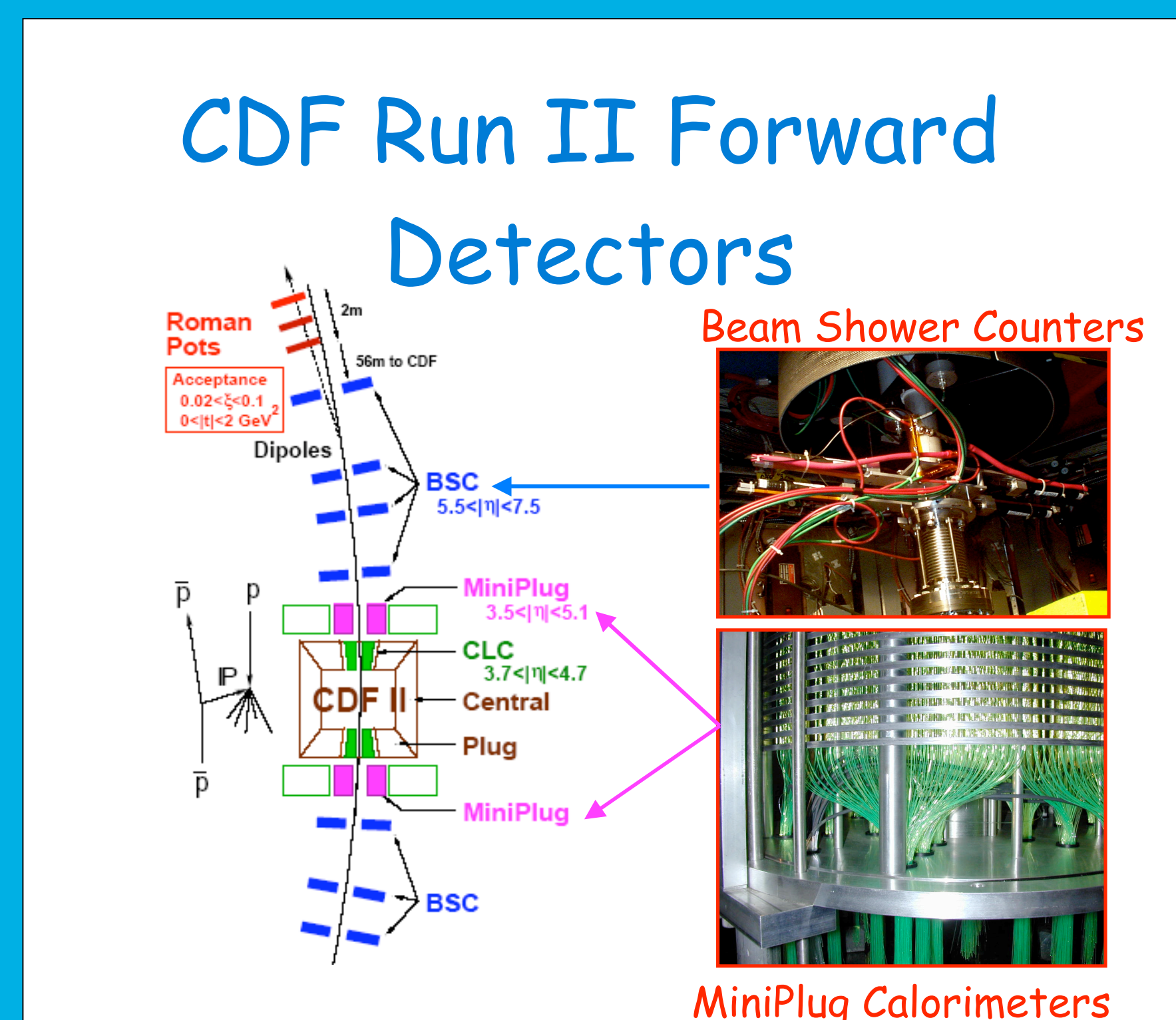
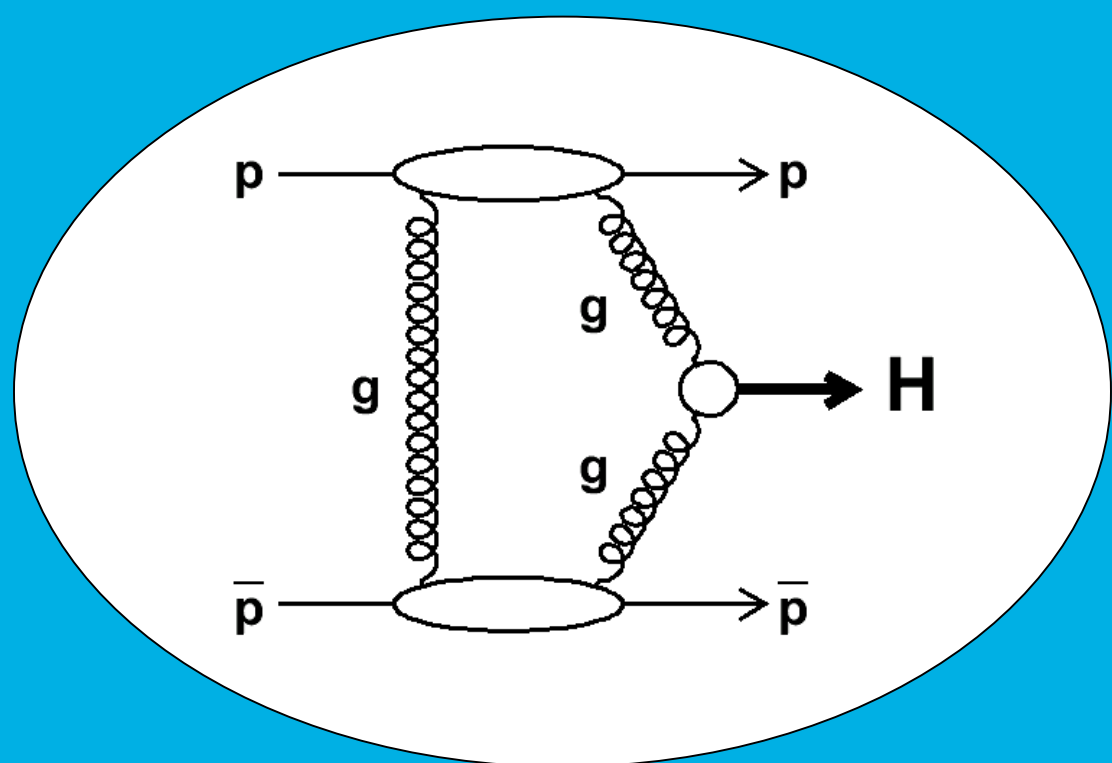
Z + b -jet cross section also measured

✓ Probe of the b content of the proton

✓ Background for searches for new physics e.g. Higgs ZH_Zbb

Towards Exclusive Higgs Production at the LHC

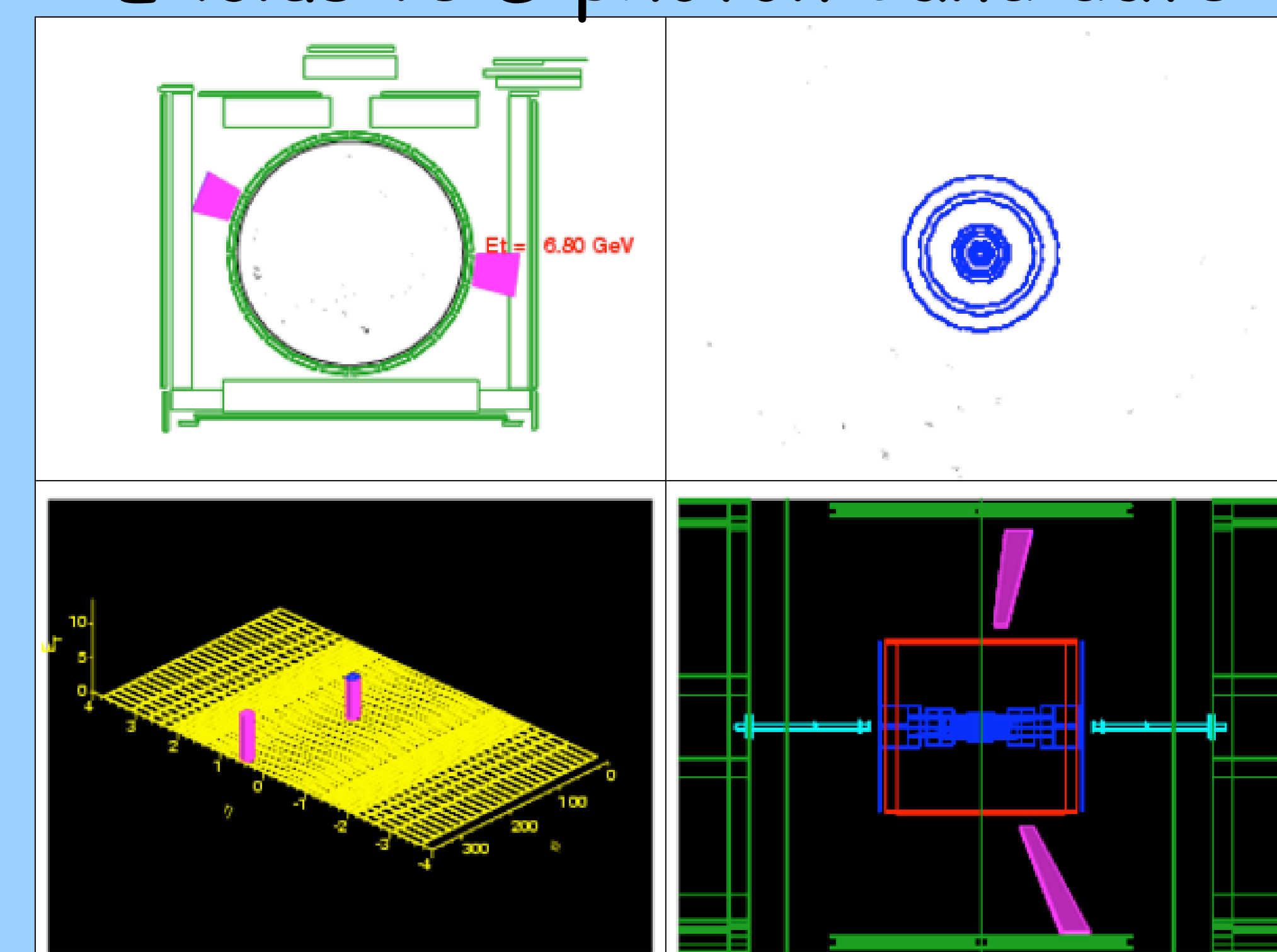
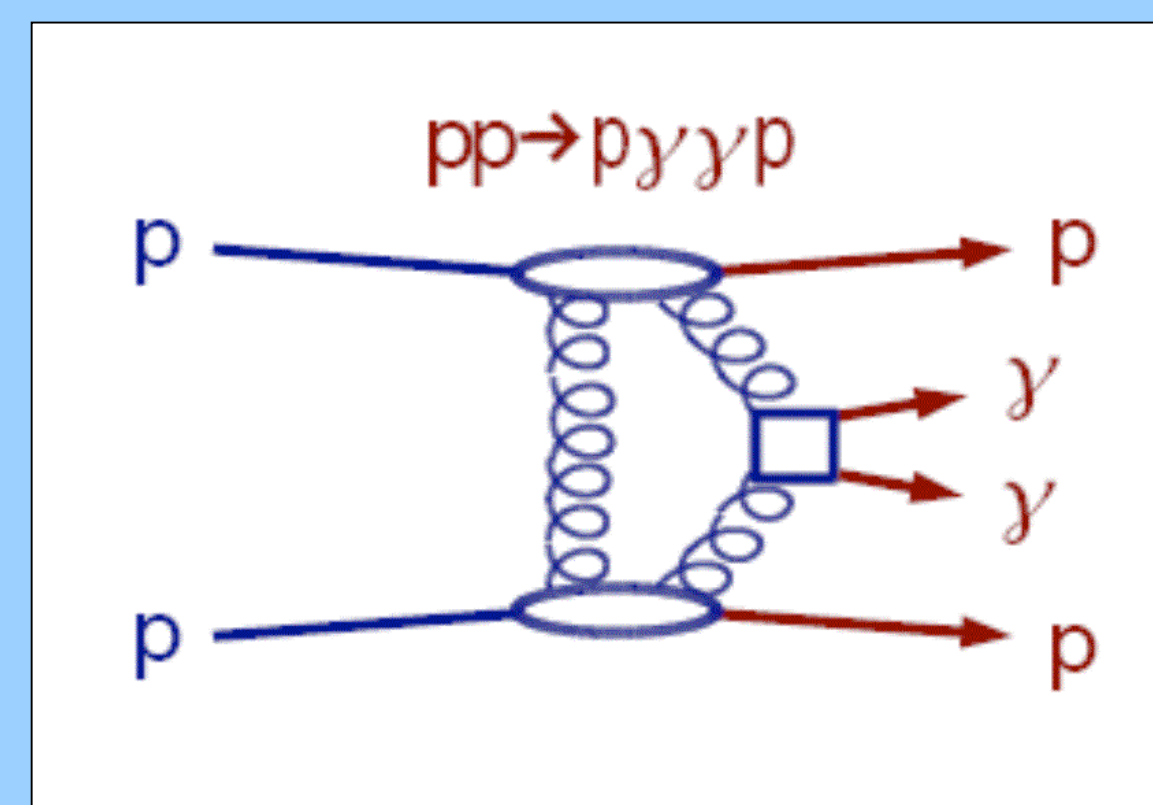
Exclusive diphoton and dijet production provide a calibration for predictions of exclusive Higgs production - an attractive Higgs discovery channel at the LHC



Requires detectors in the far forward regions to ensure there are no particles there

Event Display of Exclusive Diphoton Candidate

First evidence for exclusive __ production



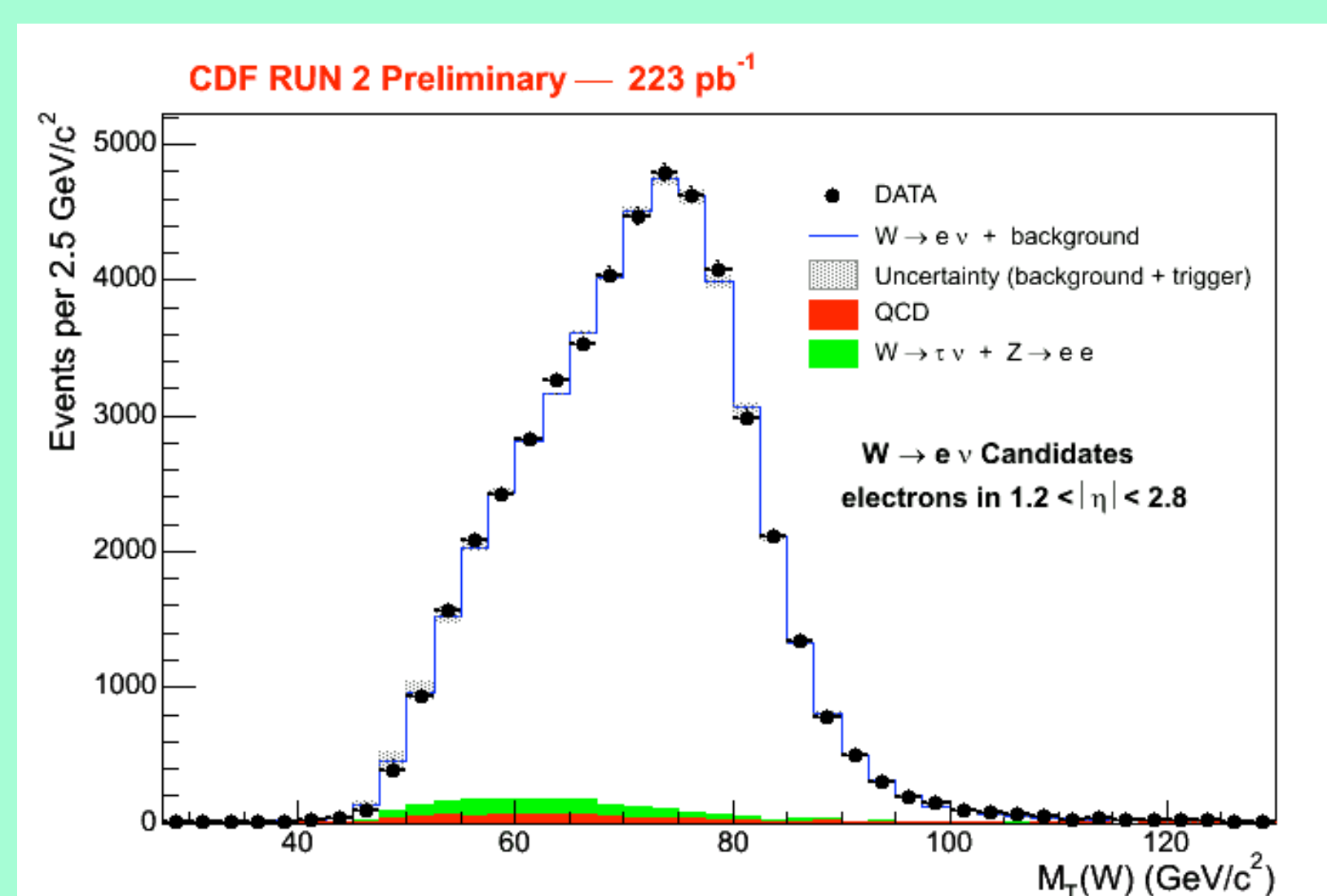
- ✓ Three events containing 2 photons and nothing else observable in the CDF detector.
 - ✓ Cross section $0.14^{+0.14}_{-0.04} \text{ (stat)} \pm 0.03 \text{ (syst) pb}$
- ✓ QED-mediated exclusive ee production also observed for the first time in hadron-hadron collisions
 - ✓ Cross section $1.6^{+0.5}_{-0.3} \text{ (stat)} \pm 0.03 \text{ (syst) pb}$ agrees with QED prediction of $1.711 \pm 0.008 \text{ pb}$
 - ✓ Provides a good check for __ production
 - ✓ Exclusive dijet production being studied as well



Electroweak Physics at CDF

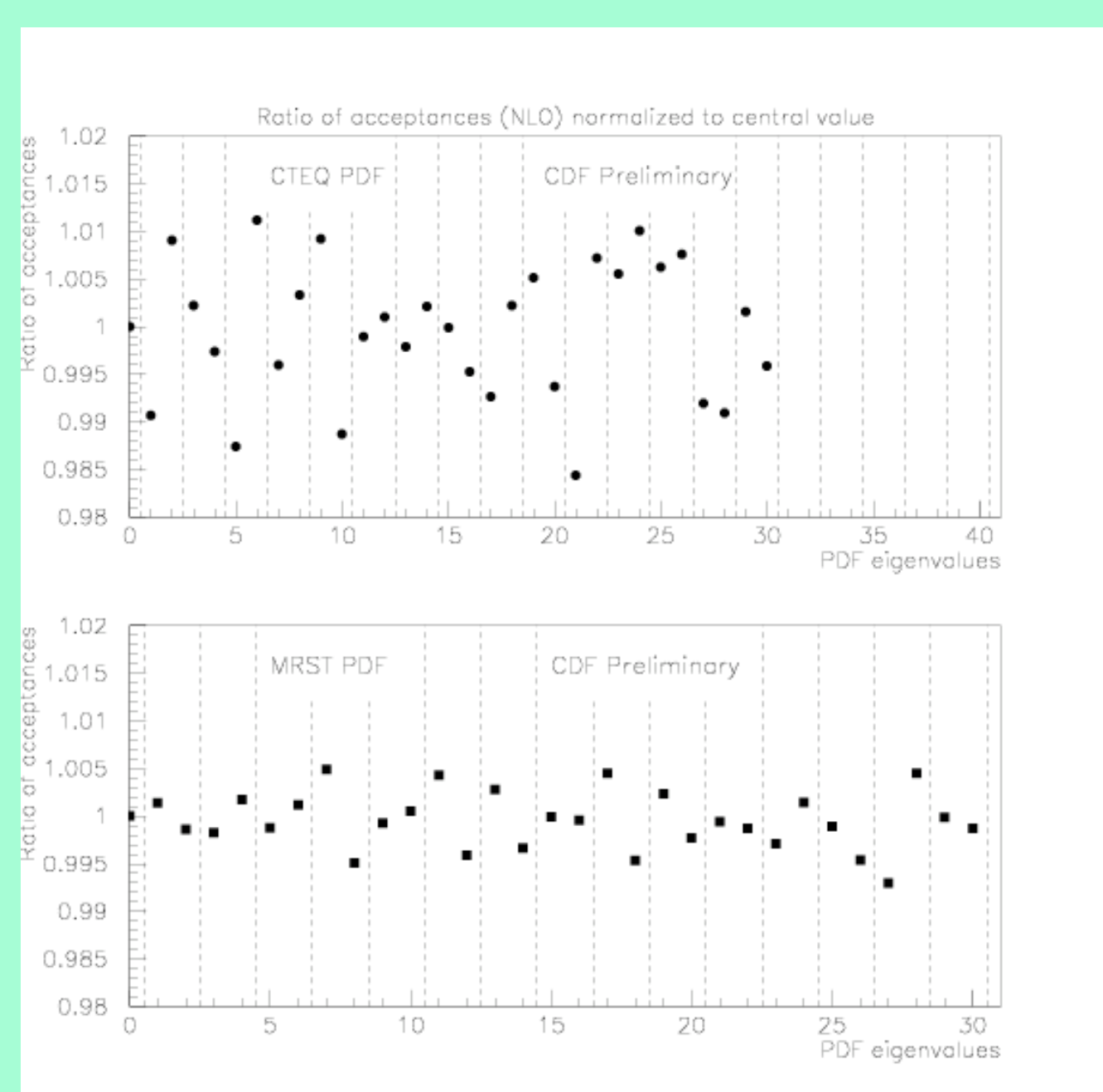
W Cross Section using Forward Electrons

Forward Electron Candidates
Selected using Combined
Calorimeter & Tracking Info



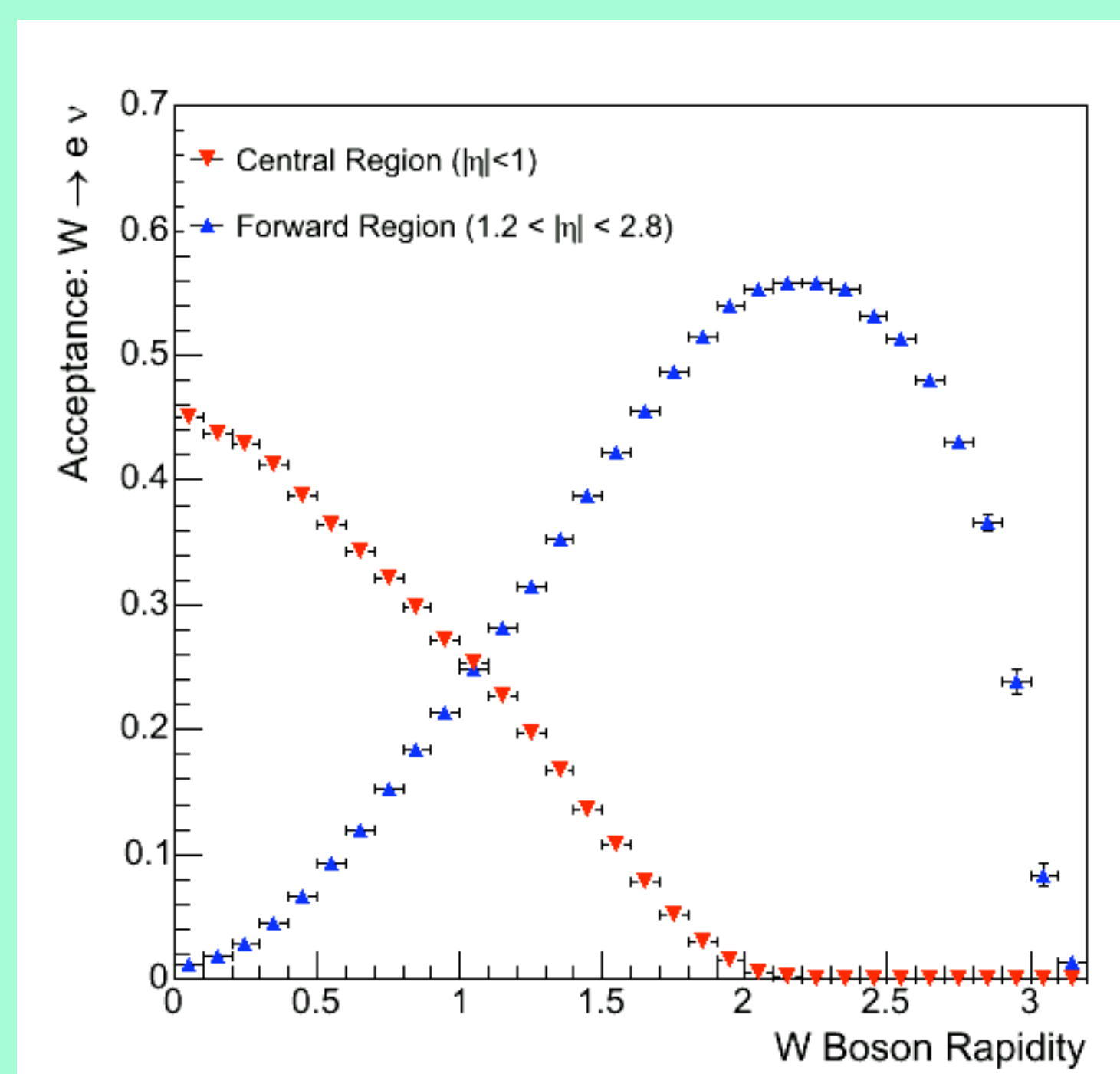
$$\sigma(pp \rightarrow W \rightarrow e\nu) = 2796 \pm 13 \text{ (stat)} \pm 95 \text{ (syst)} \pm 169 \text{ (lum)} \text{ pb}$$

Ratio of Central to Forward
 $W \rightarrow e\nu$ Cross Sections
constrains PDFs

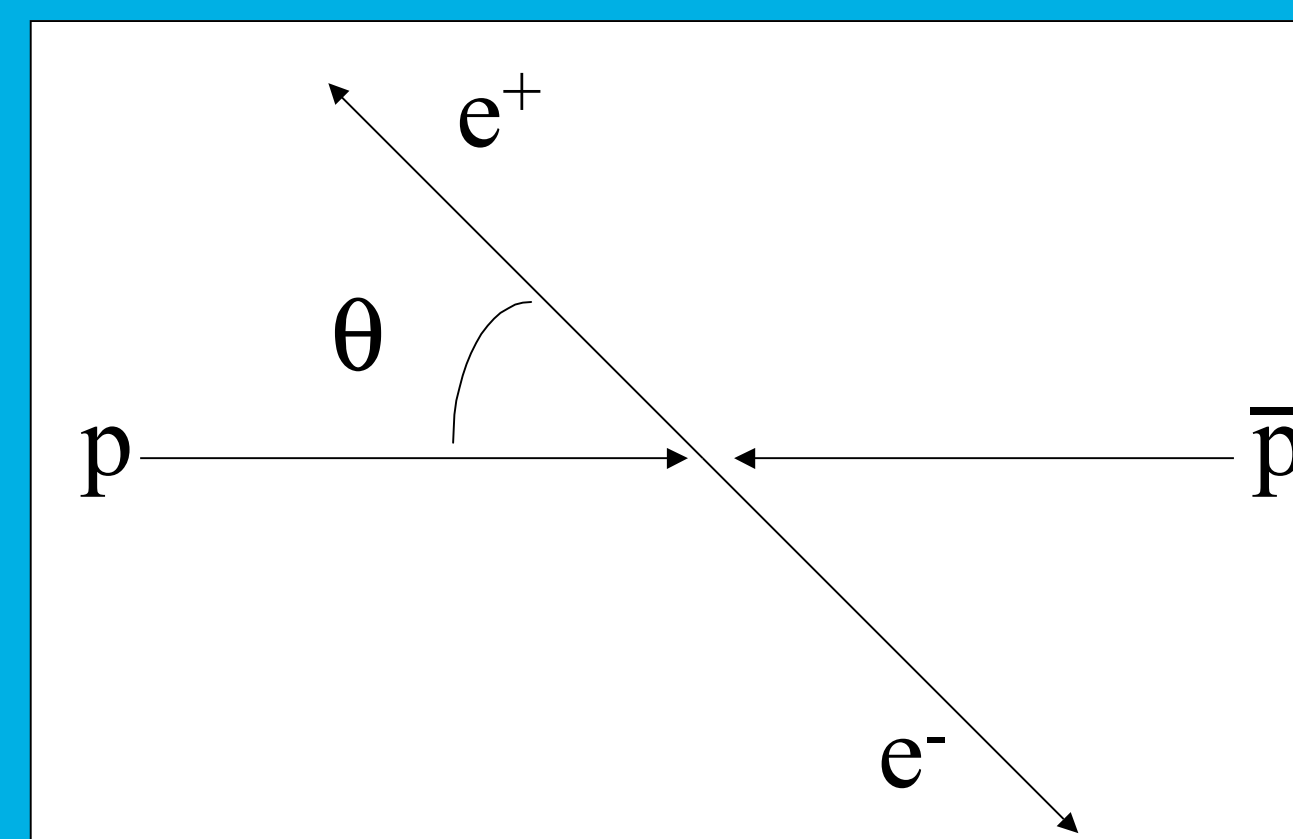


$$R(\text{exp}) = 0.925 \pm 0.033$$

NLO Predictions:
 0.924 ± 0.037 (CTEQ)
 0.941 ± 0.012 (MRST)



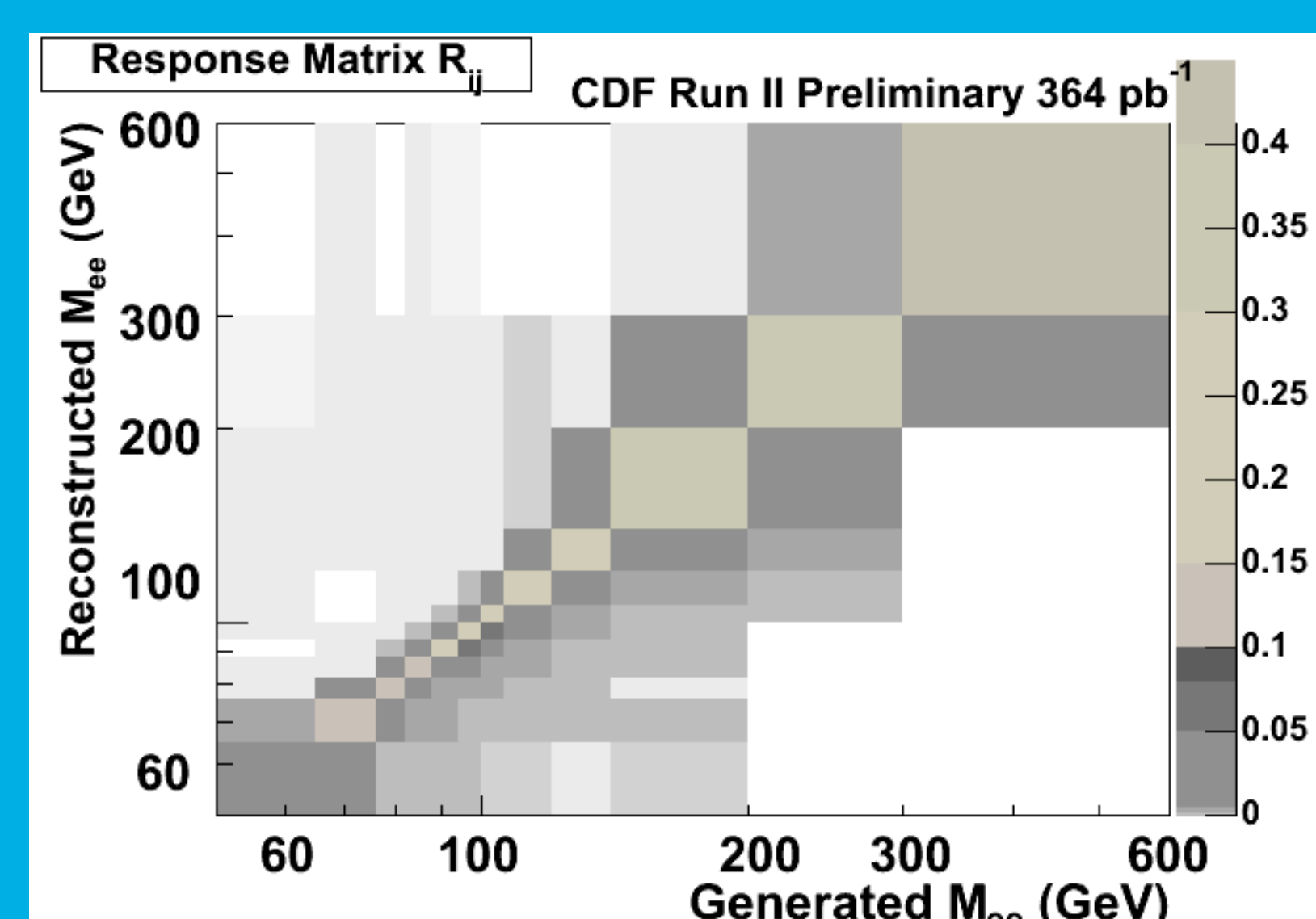
Z Forward-Backward Asymmetry



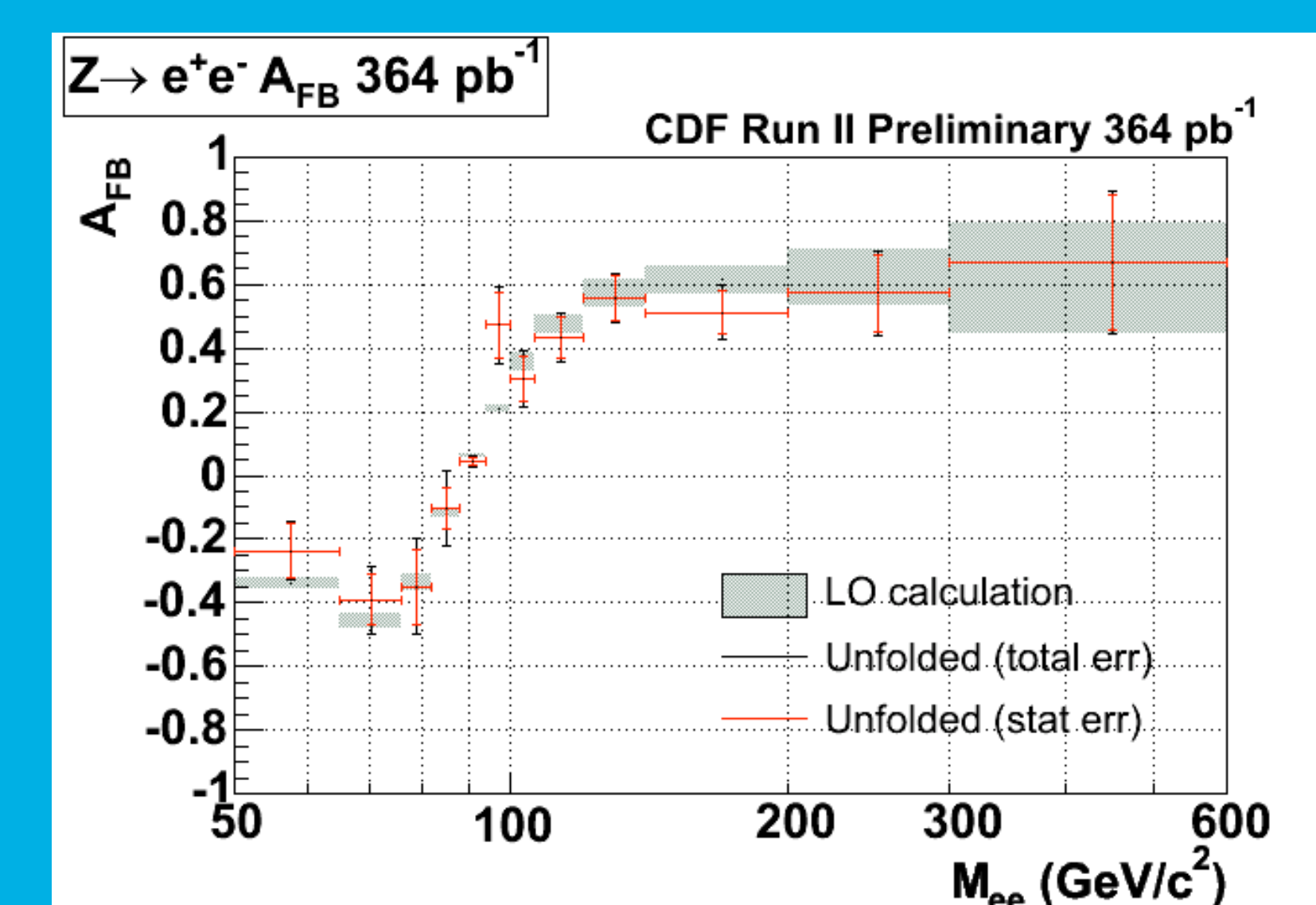
$$A_{FB} = \frac{d\sigma(\cos\theta > 0) - d\sigma(\cos\theta < 0)}{d\sigma(\cos\theta > 0) + d\sigma(\cos\theta < 0)}$$

$$A_{FB} = \frac{3B}{8A}$$

$$d\sigma / d\cos\theta = A(1 + \cos^2\theta) + B\cos\theta$$

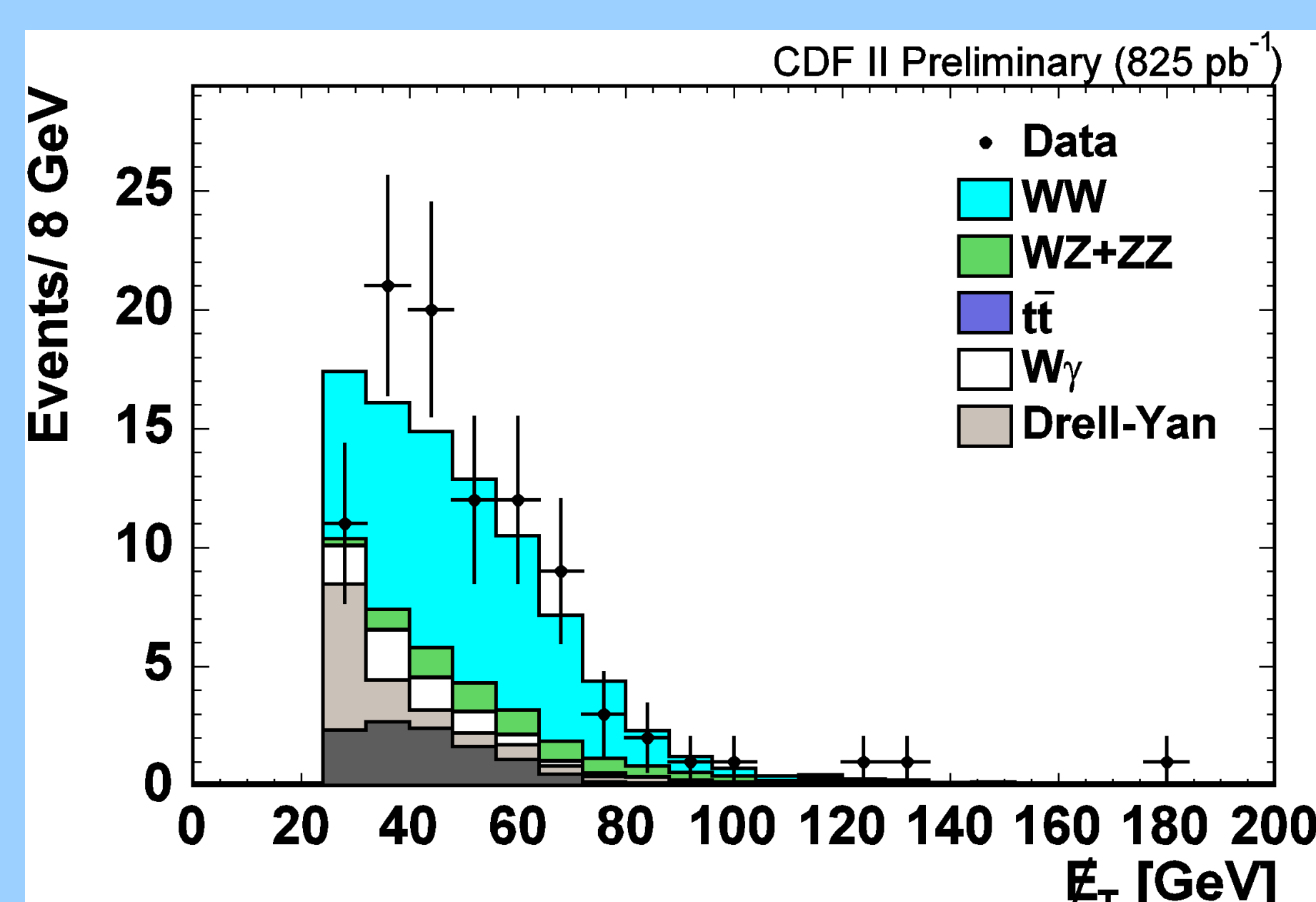


Response Matrix corrects for
Distortions in Mass Spectrum
from Detector Resolution and
Final State Radiation



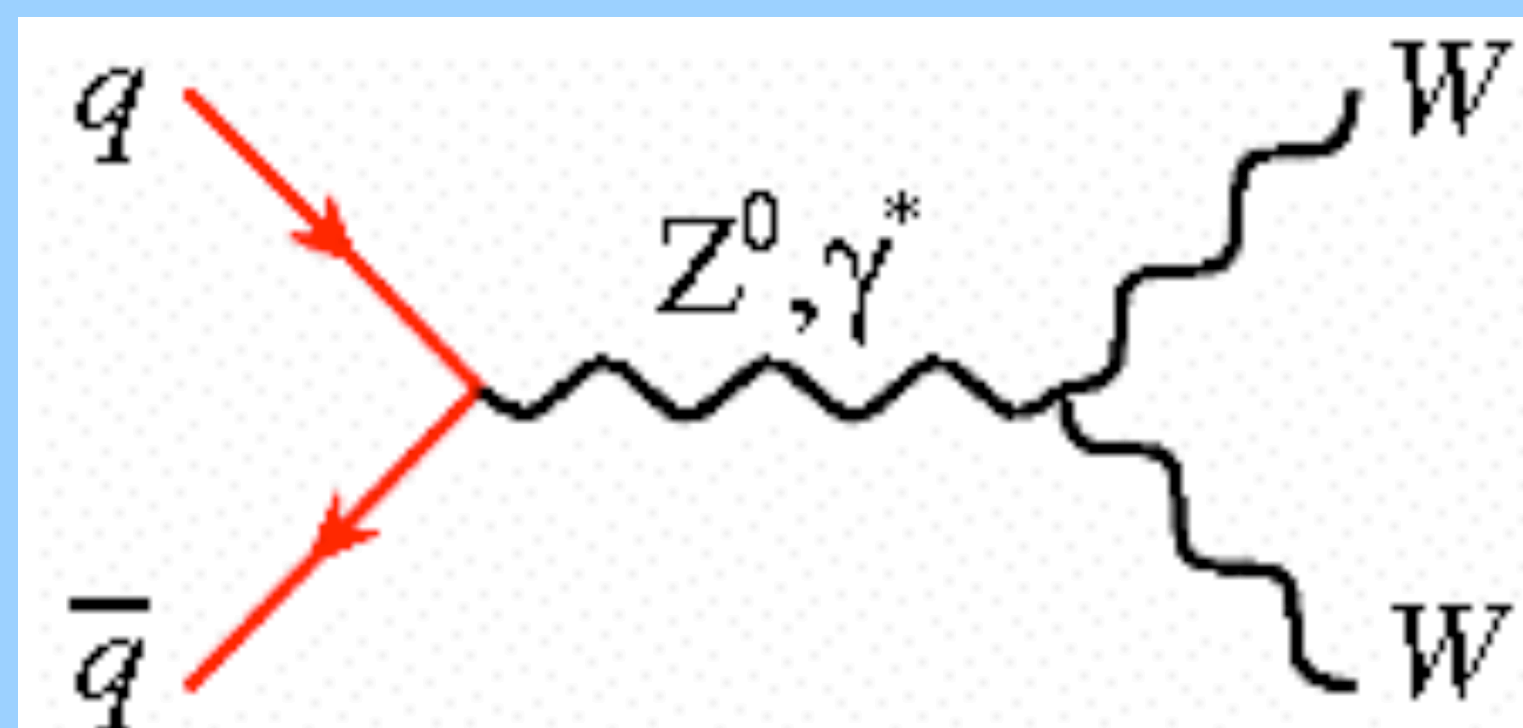
Measured Forward-Backward
Asymmetry

Diboson Physics

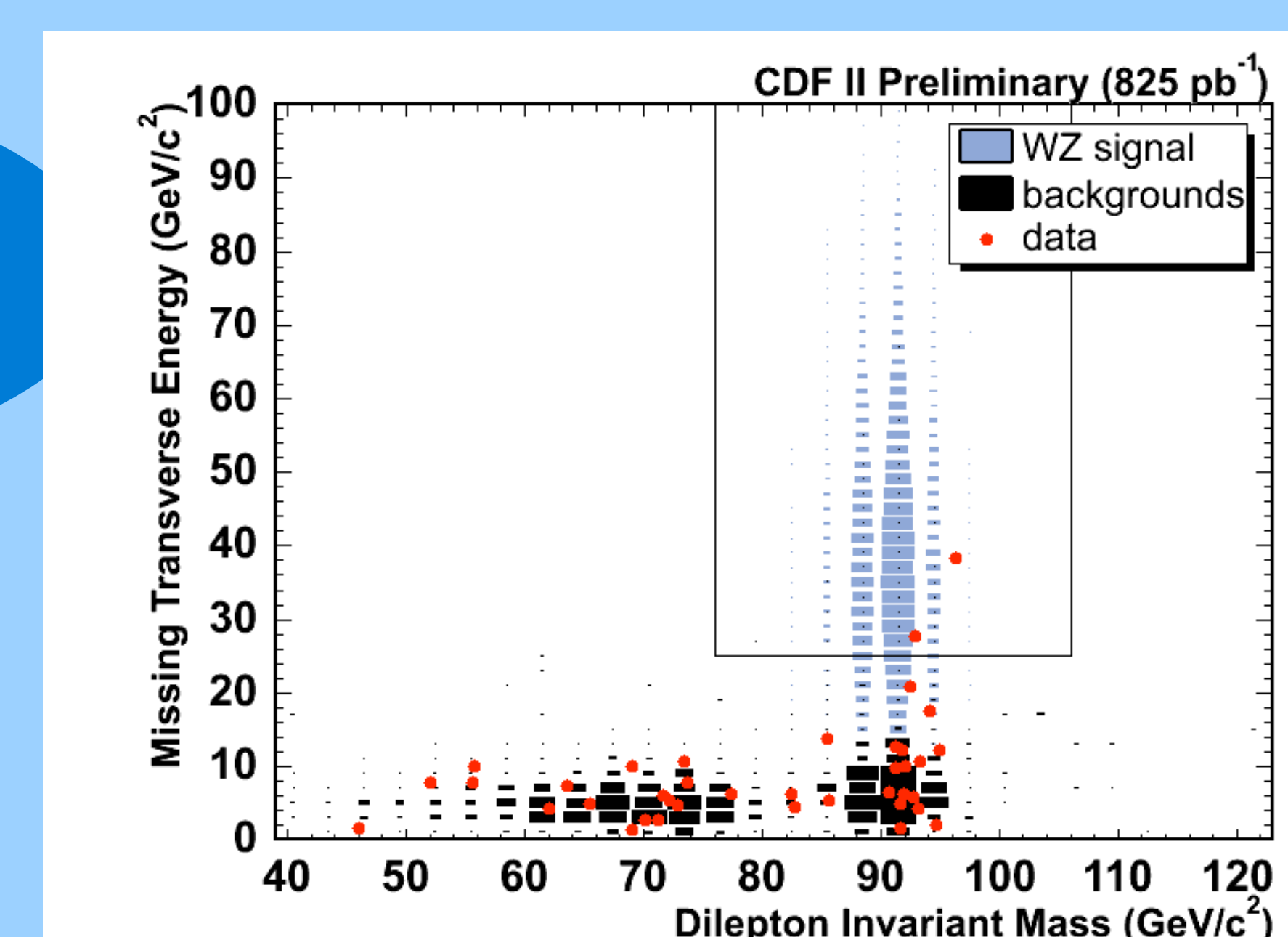
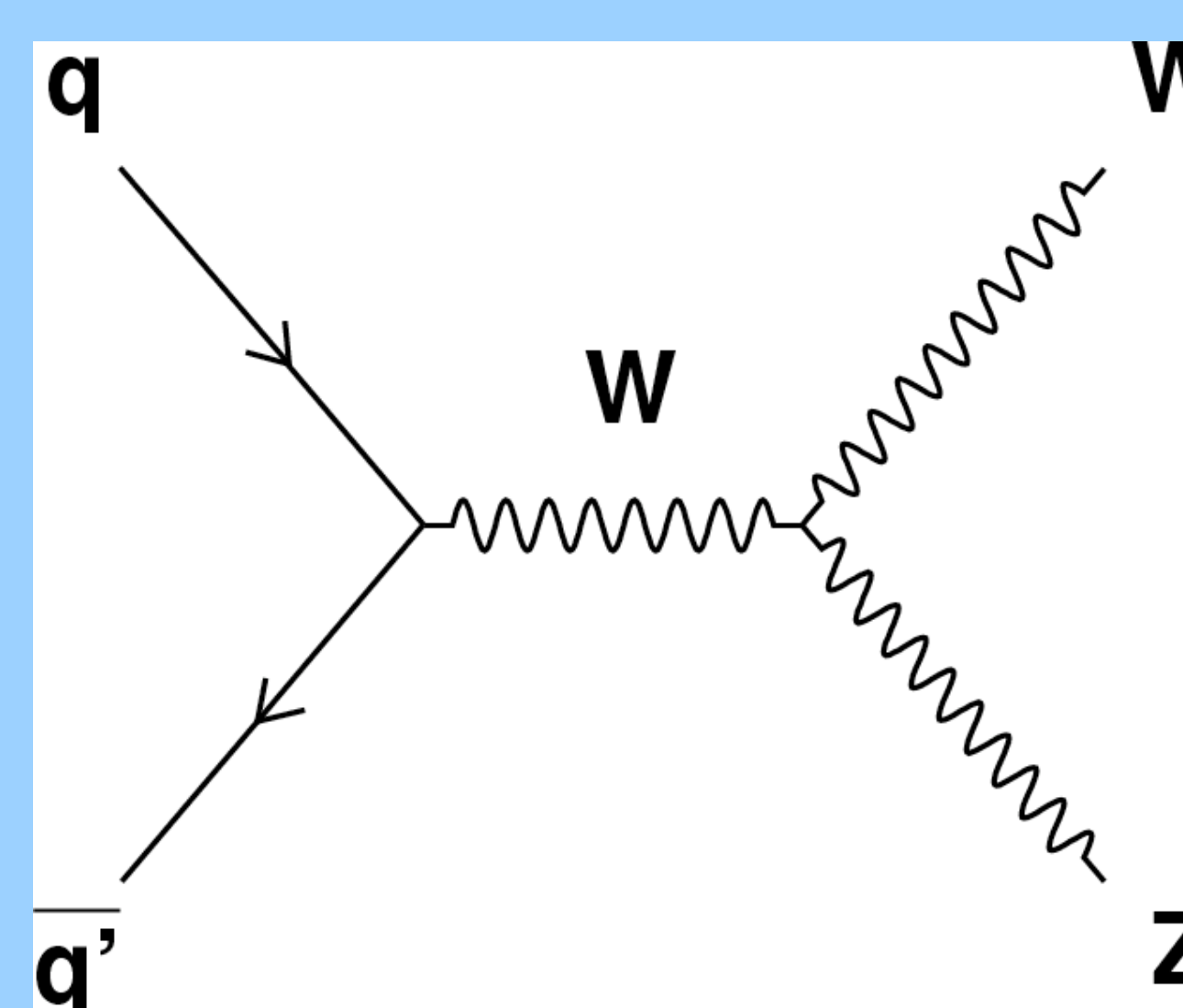


WW Production Cross Section
Measurement using 825 pb⁻¹

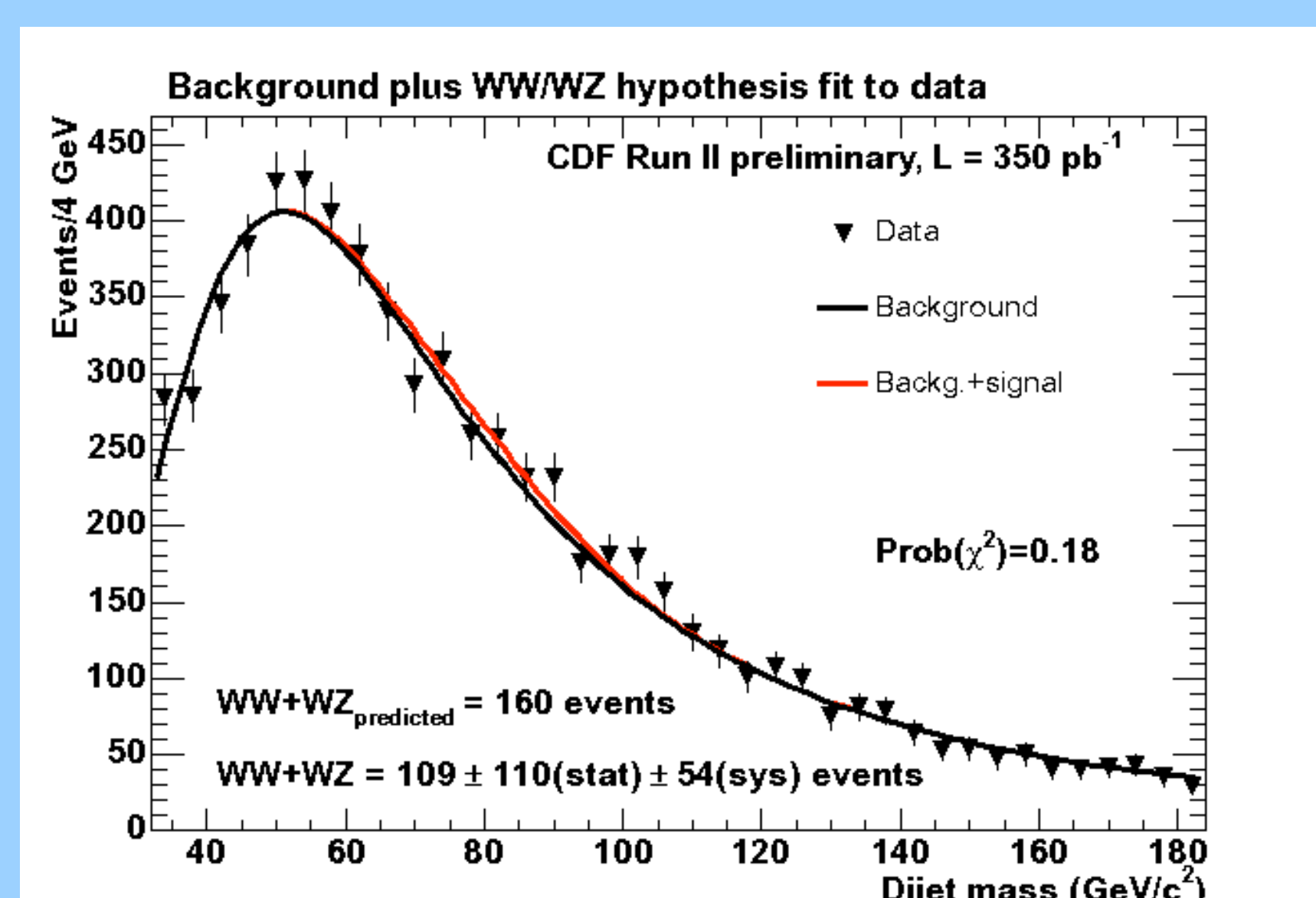
$$\sigma(pp \rightarrow WW) = 13.6 \pm 2.3 \text{ (stat)} \pm 1.6 \text{ (syst)} \pm 1.2 \text{ (lum)} \text{ pb}$$



Upper Limit on WZ
Production Cross Section
of 6.35pb at 95% CL

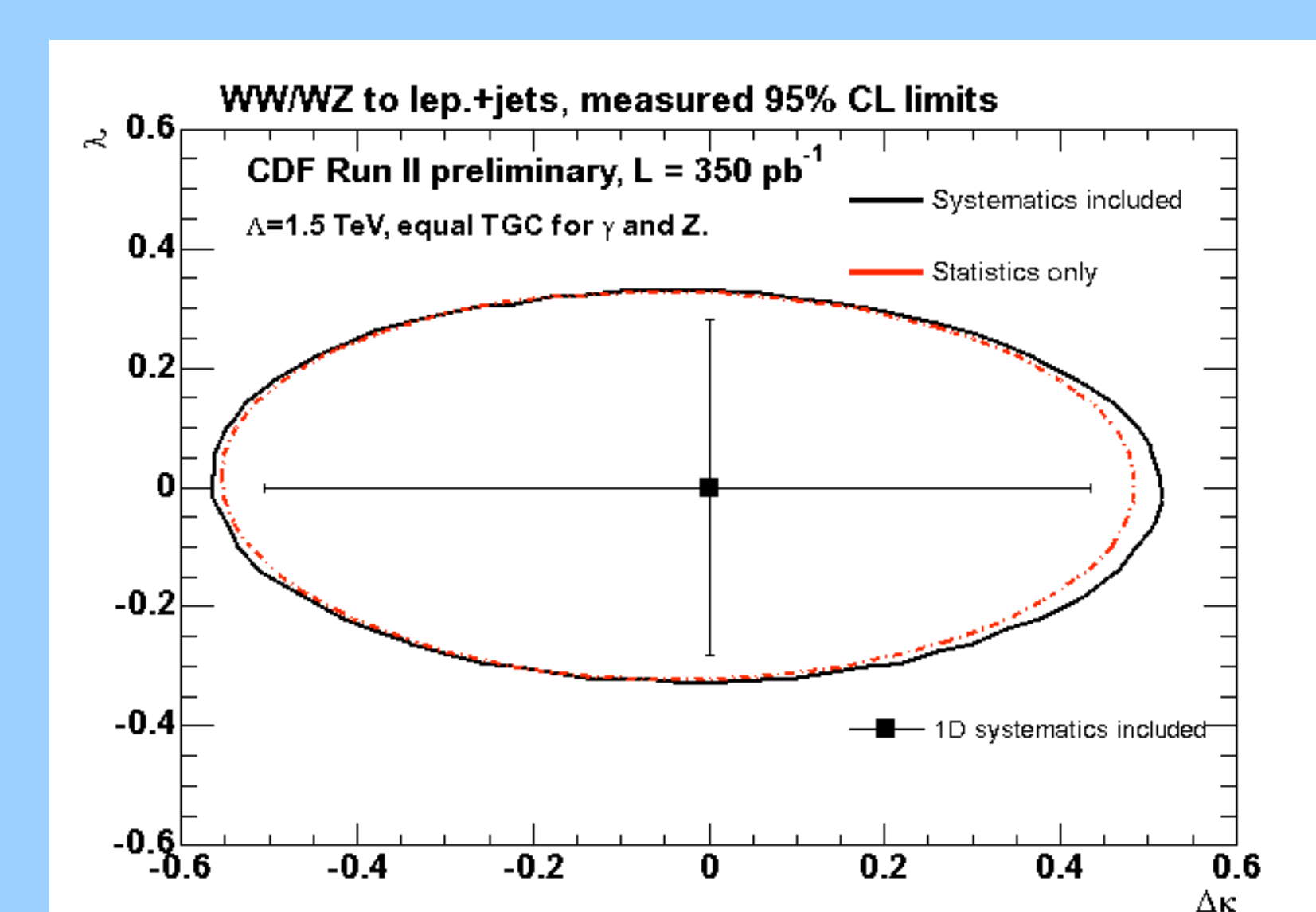


Search for WZ Production
in 825 pb⁻¹



Search for WW/WZ $\rightarrow l \nu jj$

S-channel diagrams give
experimental access to
triple gauge couplings
(WW γ or WWZ)



Anomalous Coupling Limits